

SYSTEMS AND METHODS FOR ESTIMATING HELIUM PRODUCTION IN SHROUDS OF NUCLEAR REACTORS

ABSTRACT OF THE DISCLOSURE

[0059] A method for estimating a helium content of the stainless steel core shroud in a boiling water nuclear reactor includes, in an exemplary embodiment, determining a neutron fluence for predetermined areas of the reactor, and estimating a helium content of the stainless steel shroud at predetermined areas of the reactor using the following equation: $C_{He} = 1031 * (1 - e^{-b_j * \phi_j})$, where C_{He} is the helium concentration as atomic parts per billion of helium in the stainless steel shroud per weight parts per million of boron in the stainless steel shroud, b_j is a value between about $2.50e^{-21}$ and about $5.00e^{-21}$, ϕ_j is fluence expressed as neutrons per square centimeter, and subscript j denotes thermal fluence or fast fluence.